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brain for the benefit of psychology. The author urges the study of those phenomena in animals which may be grouped under the general term "changes of character." According to the observations most generally received, the ideational processes are dependent on the integrity of the sensory and motor cortical areas. The question is then asked whether the sense perceptions are due to a simple and elementary reaction of a cortical area, or are complex and based on the association of two or more cortical areas? The instances which the author then adduces from his own experiments and those of others favor the latter view. Bianchi finds vision affected by lesions in the cephalic half of the cerebral hemisphere, in the dog, and the intensity of the disturbance increased as the lesion is carried further caudad. If the place of the excision affects only the amount of the disturbance, it is otherwise with stimulation, where the character of the reaction depends on the point stimulated. For example, the stimulation of the most cephalic portion of his (Bianchi's) cortical area produces closure of the eyelid; of the middle portion, movements of the eyeball; and of the most caudal portion, no movement. When this cephalic area is excised, there are no changes visible in the conjunctiva; yet, stimulation of the conjunctiva in dogs thus operated produces closure of the eyelid, as it would in a normal dog. He, therefore, infers, since the reaction can be gotten as described, after removal of the cortical centre, that when the reaction followed its stimulation it was not direct but due to the indirect excitation of the sensory cells of the visual area. Other instances are given where sensory disturbances follow the lesion of so-called motor areas, and it is concluded that the interruption of associative paths may explain these results. The author's next question is whether there may not be something over and above the sensory and motor centres which controls their action and gives capability for attention. From this point of view he finds, as others have done, dogs from which the extreme frontal cortex has been removed, very instructive. In such a case the animal appears intact, so far as sensation and motion are concerned, but in conduct he is highly deficient. This leads him to the tentative opinion that there is some relation between the completeness of the associative processes and attention and the lack of the latter in the animals in question is explained by the disturbance of the former. His final observation is on the variations in the character of different dogs from which the same amount of cortex has been removed from different regions, and here he obtains the classic results as described by Goltz in his earlier experiments.

The Principles of Psychology. WILLIAM JAMES. 2 Vols. New York, 1890. Henry Holt & Co.

The standpoint of any psychological treatise toward the anatomy and physiology of the nervous system is certainly of interest to those working along the latter lines. In these volumes there is almost no anatomy in the stricter sense of the term. The author's interests are on the physiological side, and certainly what he gives is most admirable. The nerve centres in the encephalon of the frog furnish the introduction to the whole subject, and the reactions of the animal, from the case where it is possessed of nothing but the spinal cord, through the intermediate cases up to the normal individual, are followed and described in accordance with the best results. The well-known scheme of Meynert, representing the child and the candle, and showing the nerve connection in the inexperienced child, who did burn his finger, as compared with the connections established in the same child when experience has acted on it, is used to lead up to the discussion of the education of the hemispheres. A brief allusion to phrenology furnishes here a useful preface, and is followed by as well proportioned a sketch of the history

of cerebral localization as is to be anywhere found. Naturally in such a book the latest results on some points, as for example, the recent observations on motor reactions from sensory areas (the visual and auditory centres), are overlooked; also the increasing evidence for a decidedly detailed projection of the retina in the visual area in dogs and monkeys, is not brought out. Neither these nor other minor omissions would seriously alter the general conclusions, however, and these latter are certainly drawn with due appreciation of the development and migration of function within the encephalon and the possibilities which that conception brings with it. Motion and sensation represented in the cerebrum; consciousness as the companion of nervous currents in the higher nerve centres, and associations between these centres themselves and the lower centres, furnish the background for the subsequent discussions. Since this conception is comprehensive, simple and highly plastic, it is easily handled in the more or less speculative chapters which follow, and it would be uncharitable to find fault with it. At the same time, there are those who long to get the problems discussed into the laboratory. For their purpose hypotheses must be rigid and anatomy detailed, so that while they will find these pages full of suggestion, they will not find the relations of brain function and brain form developed in a manner which permits of experimentation until both are more narrowly formulated.

The Origin of the Cerebral Cortex and the Homologies of the Optic-lobe Layers in the Lower Vertebrates. ISAAC NAKAGAWA. Journ. of Morphology. Vol. IV, No. I. July, 1890.

It was natural that Edinger's statement that the homolog of the cortex in the higher vertebrates could not be traced further down the scale than the reptiles, should stimulate a more careful study of the cerebral mantle in the amphibia. We have recently reviewed a paper by Oyarzun (AMER. JOUR. PSY., III, p. 377), coming from Edinger's laboratory, which shows that undoubted nerve cells are found in the mantles of several amphibia which were examined. Quite independently and in another way Nakagawa, working under the direction of H. F. Osborn, has compared the cells in the cerebral mantle in the Amphibia (*Rana*, *Menobranchus* and *Spelerpes*), the Reptilia (*Tropidonotus* and *Emys*), the Aves (*Columba*), and the Mammalia (*Didelphys*), and concludes that, though poorly developed, there is a layer of cells in the cerebral mantle of the Amphibia which must be considered the homolog of the cortex in the higher forms. In the first three classes the same method of comparison is applied to the several layers of the optic lobes, and from them a provisional scheme of the functional value of the various layers of this region is constructed.

Ueber früh erworbene Grosshirndefecte. Dr. v. MONAKOW. Correspondenz-Blatt für Schweiz. Aerzte, Jahrg. XX, 1890.

Under this title v. Monakow briefly describes the brain of two young children in whom during the first month and first year respectively, a porencephalous condition developed which involved the region supplied by the *arteria fossæ Sylvii*. In both cases the lesion was on the left side of the brain. This area is that of the inferior frontal gyrus, the *operculum*, *insula*, and the first temporal gyrus, and the general point of his discussion is the relation which these portions of the hemispheres bear to the nuclei of the thalamus. Of special interest is the comparatively circumscribed degeneration of the *geniculatum internum*, which has not been described before for man and which the author associates with the defect in the temporal lobe, thus bringing his results here into harmony with those obtained by his experiments on animals. Whether the *geniculatum internum* is associated with the sense of hearing, must still be further investigated.